Stoller
Grand Junction Office established 1959

GJO-2003-537-TAC

299-W11-58 (A7300)
Log Data Report

Borehole Information:

Borehole: 299-W11-58 (A7300)			**Site:** 216-T-6 Crib		
Coordinates (WA State Plane)		**GWL (ft)[1]:** Not deep enough		**GWL Date:**	10/20/2003
North	**East**	**Drill Date**	**TOC[2] Elevation**	**Total Depth (ft)**	**Type**
136,659.727 m	567,191.243 m	June 1947	217.906 m	75	Cable Tool

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	4.4	8 5/8	7 7/8	3/8	+4.4	75
The logging engineer measured the casing stickup using a steel tape. A caliper was used to determine the outside casing diameter. The caliper and inside casing diameter were measured using a steel tape. Measurements were rounded to the nearest 1/16 in. Casing thickness was calculated.						

Borehole Notes:

Borehole coordinates, elevation, and well construction information are from measurements by Stoller field personnel, HWIS[3], and Chamness and Merz (1993). Zero reference is the top of the 8-in. casing. The borehole was swabbed prior to logging and no contamination was observed.

Logging Equipment Information:

Logging System:	Gamma 1E		**Type:** SGLS (70%)
Calibration Date:	07/2003	**Calibration Reference:**	GJO-2003-468-TAR
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Logging System:	Gamma 1C		**Type:** HRLS (planar) SN: 39-A314
Calibration Date:	04/2003	**Calibration Reference:**	GJO-2003-429-TAC
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	**1**	**2/Repeat**			
Date	10/20/03	10/20/03			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	76.0	20.0			
Finish Depth (ft)	4.0	10.0			
Count Time (sec)	100	100			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			

Log Run	1	2/Repeat			
ft/min	N/A[4]	N/A			
Pre-Verification	AE053CAB	AE053CAB			
Start File	AE053000	AE053073			
Finish File	AE053072	AE053083			
Post-Verification	AE054CAA	AE054CAA			
Depth Return Error (in.)	-1	N/A			
Comments	No fine-gain adjustment.	No fine-gain adjustment.			

High Rate Logging System (HRLS) Log Run Information:

Log Run	1	2/Repeat			
Date	10/22/03	10/22/03			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	44.0	36.0			
Finish Depth (ft)	32.0	30.0			
Count Time (sec)	300	300			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A	N/A			
Pre-Verification	AC078CAB	AC078CAB			
Start File	AC078000	AC078013			
Finish File	AC078012	AC078016			
Post-Verification	AC078CAA	AC078CAA			
Depth Return Error (in.)	N/A	0			
Comments	No fine-gain adjustment.	No fine-gain adjustment.			

Logging Operation Notes:

Zero reference was top of the 8-in. casing. Logging was performed with a centralizer installed on each sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT (^{40}K, ^{238}U, and ^{232}Th) verifier with serial number 082. Verification measurements for the HRLS used the verifier with serial number 1013.

Analysis Notes:

Analyst:	Henwood	Date:	11/17/03	Reference:	GJO-HGLP 1.6.3, Rev. 0

SGLS and HRLS pre-run and post-run verification spectra were collected at the beginning and end of each day. The verification spectra were all within the established criteria.

Log spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated in EXCEL (source files: G1EJul03.xls and G1CApr03.xls for the SGLS and HRLS, respectively), using parameters determined from analysis of recent calibration data. Zero reference was the top of the 8-in. casing. On the basis of Chamness and Merz (1993), the casing configuration was assumed to be one string of 8-in. casing to total depth (75 ft). The casing correction factor was calculated assuming a casing thickness of 0.3750 in. This casing thickness is based upon the field measurement. A water correction was not required.

Dead time corrections are required when dead time exceeds 10.5 percent. Dead time (SGLS) exceeded 10.5 percent in the interval from 31 to 43 ft. Maximum dead time was about 92 percent at 34 ft. At SGLS dead time greater than 40 percent, peak spreading and pulse pile-up effects may result in underestimation of activities. Dead time exceeded 40 percent in the interval from 32 to 42 ft. The HRLS was used to acquire data in this interval.

Log Plot Notes:

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides (^{40}K, ^{238}U, and ^{232}Th), and man-made radionuclides. Plots of the repeat logs versus the original logs are included. In addition, a comparison log plot of man-made radionuclides is provided to compare the data collected in 1992 and 1995 by Westinghouse Hanford Company's Radionuclide Logging System (RLS) with SGLS data. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation.

Results and Interpretations:

^{137}Cs was the only man-made radionuclide detected in this borehole. ^{137}Cs was detected near the ground surface (4 through 17 ft) at concentrations ranging from the MDL (0.2 pCi/g) to 12.5 pCi/g, which was measured at 8 ft in depth. ^{137}Cs was also detected in the interval from 26 through 75 ft. The range of concentrations was from the MDL to 4,740 pCi/g, which was measured at 34 ft.

Recognizable changes in the KUT logs occurred in this borehole. A change of 5 pCi/g or more in apparent ^{40}K concentrations occurs between 30 and 42 ft. This increase in ^{40}K concentrations may represent the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

The plots of the repeat logs demonstrate repeatability of the SGLS data for both the man-made and natural radionuclides (662, 609, 1461, and 2614 keV). The HRLS data also show good repeatability.

Gross gamma logs from Fecht et al. (1977) (attached) indicate that the sediments surrounding this borehole contained significant amounts of gamma-emitting contamination as early as 1963 through at least 1976. The logs from 4/26/63 and 5/6/76 detected gamma activity above background in the interval from 20 ft (6 m) to 49 ft (15 m). The SGLS detected ^{137}Cs in this interval.

Comparison log plots of data collected in 1992 and 1995 by Westinghouse Hanford Company and in 2003 by Stoller are included. The 1993 and 1995 concentration data for ^{137}Cs are decayed to the date of the SGLS logging event in October 2003. Since 1993, ^{137}Cs activities appear to have decreased as predicted by radioactive decay.

References:

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNL-8800, Pacific Northwest Laboratory, Richland, Washington.

Fecht, K.R., G.V. Last, and K.R. Price, 1977. *Evaluation of Scintillation Probe Profiles from 200 Area Crib Monitoring Wells*, ARH-ST-156, Atlantic Richfield Hanford Company, Richland, Washington.

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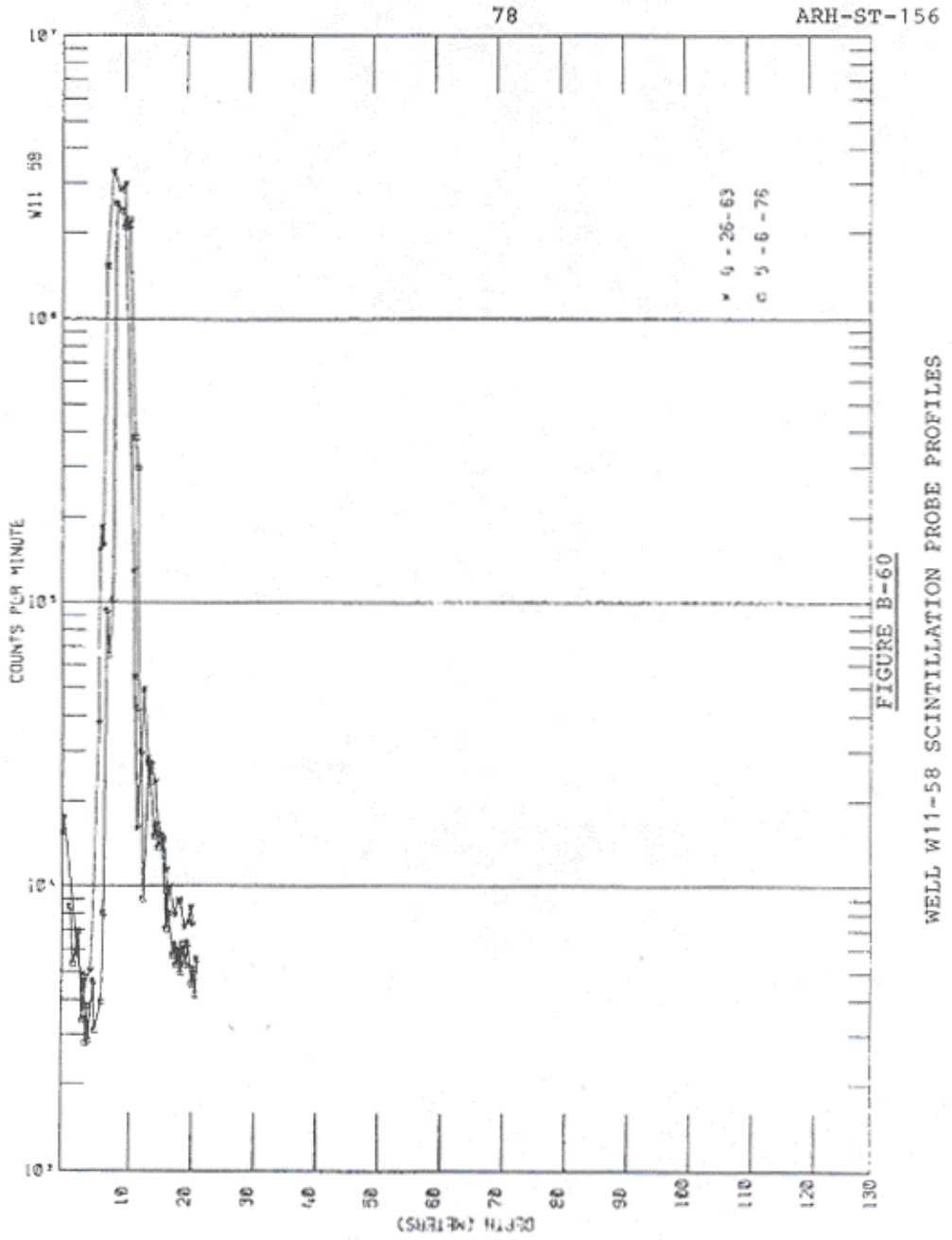
[1] GWL – groundwater level
[2] TOC – top of casing
[3] HWIS – Hanford Well Information System
[4] N/A – not applicable



from Fecht et al. (1977)

Scintillation Probe Profiles for Borehole 299-W11-58, Logged on 4/26/63 and 5/6/76

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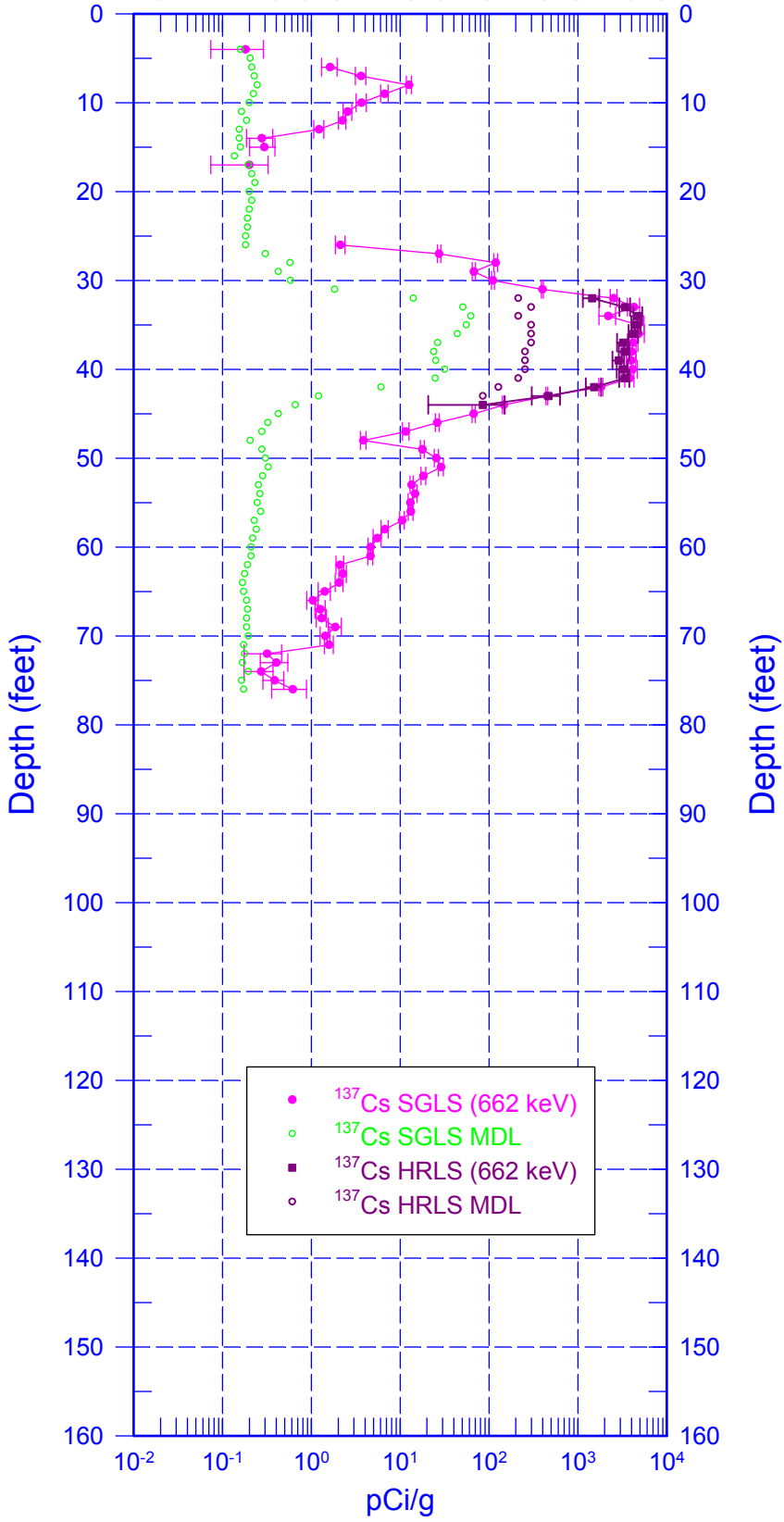
Man-Made Radionuclides

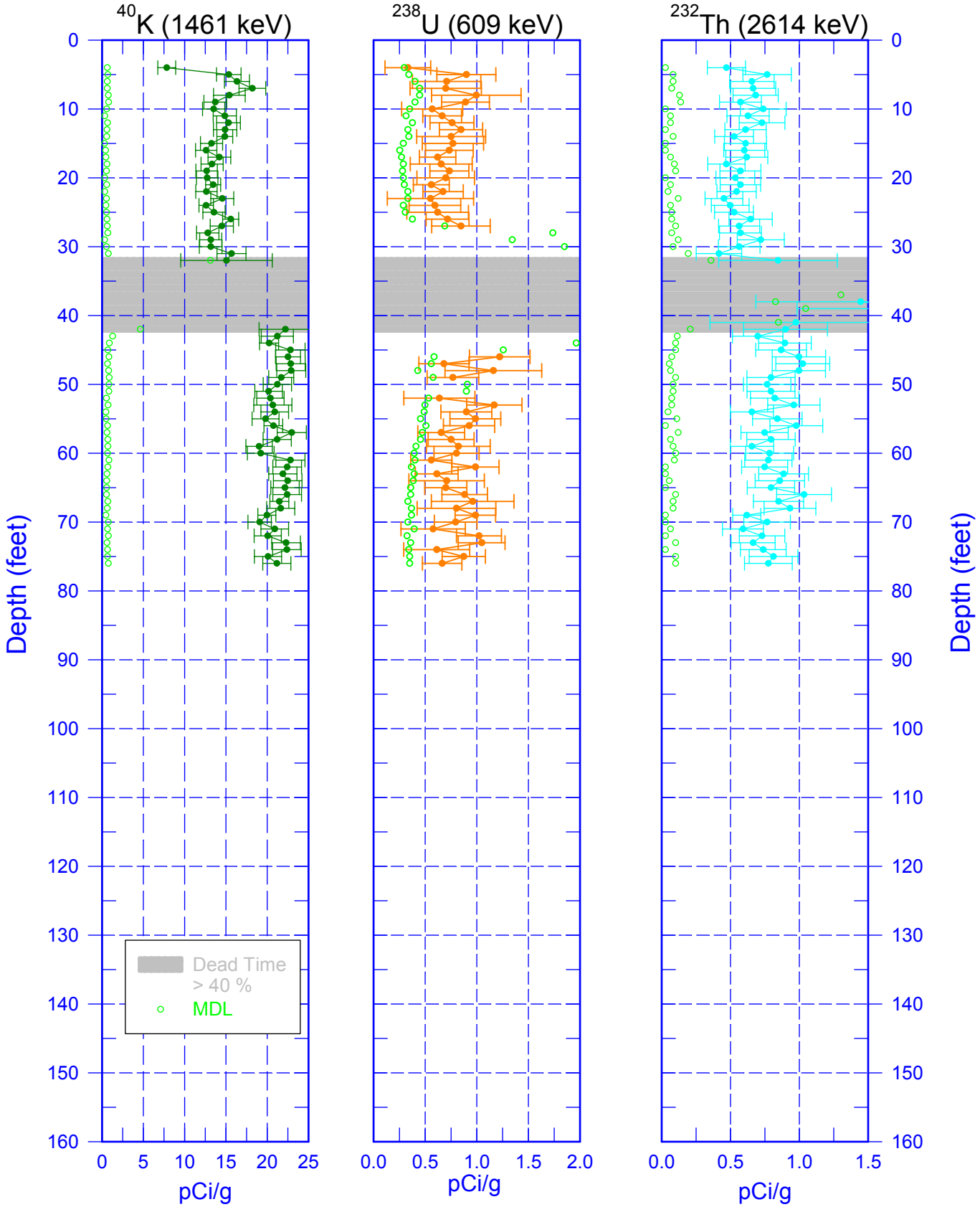


Zero Reference - Top of Casing

Depth scale: 1" = 20 ft

Last Log Date - 10/22/03

299-W11-58 (A7300)
Natural Gamma Logs

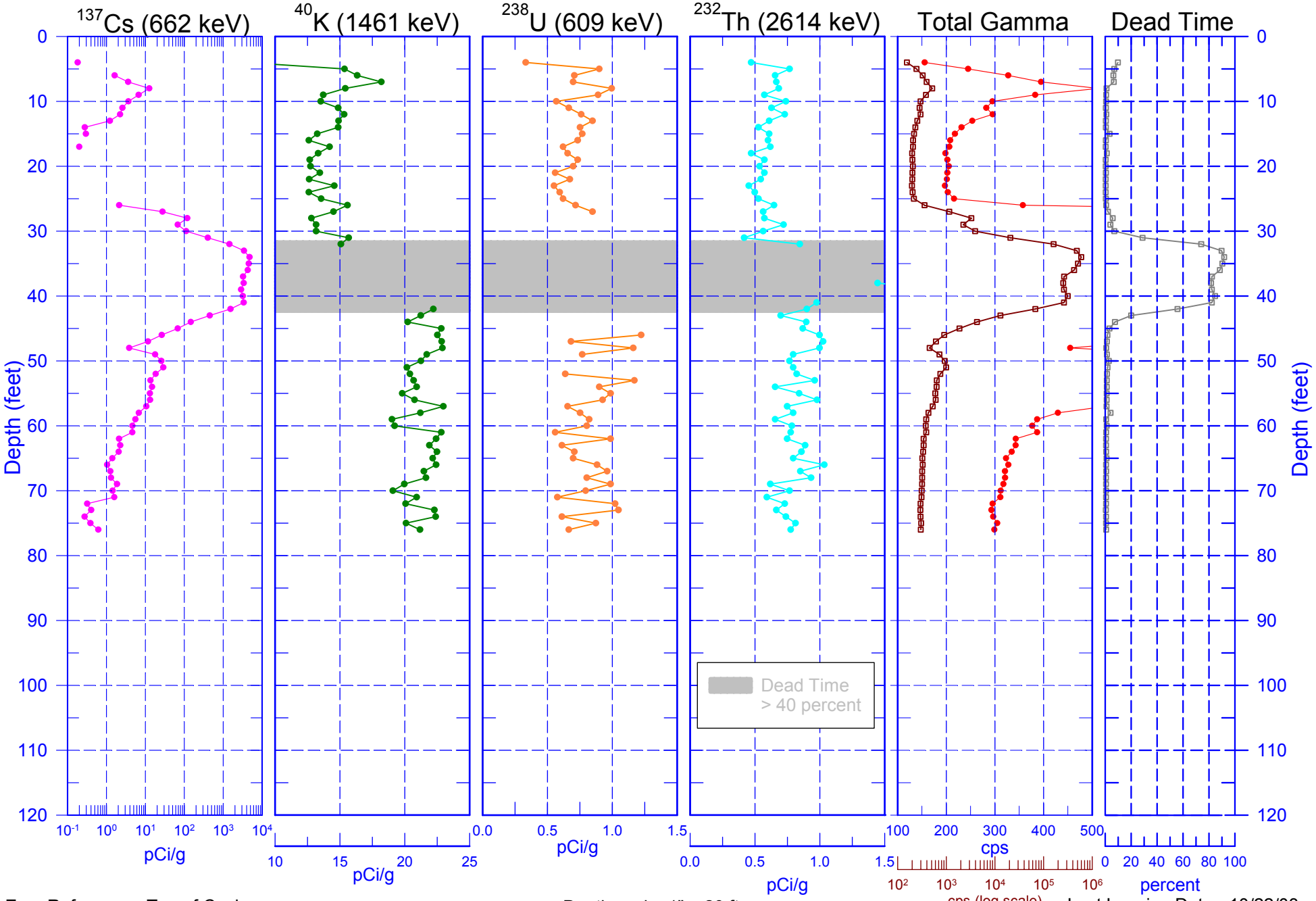


Zero Reference = Top of Casing

Depth scale: 1" = 20 ft

Last Log Date - 10/22/03

299-W11-58 (A7300) Combination Plot

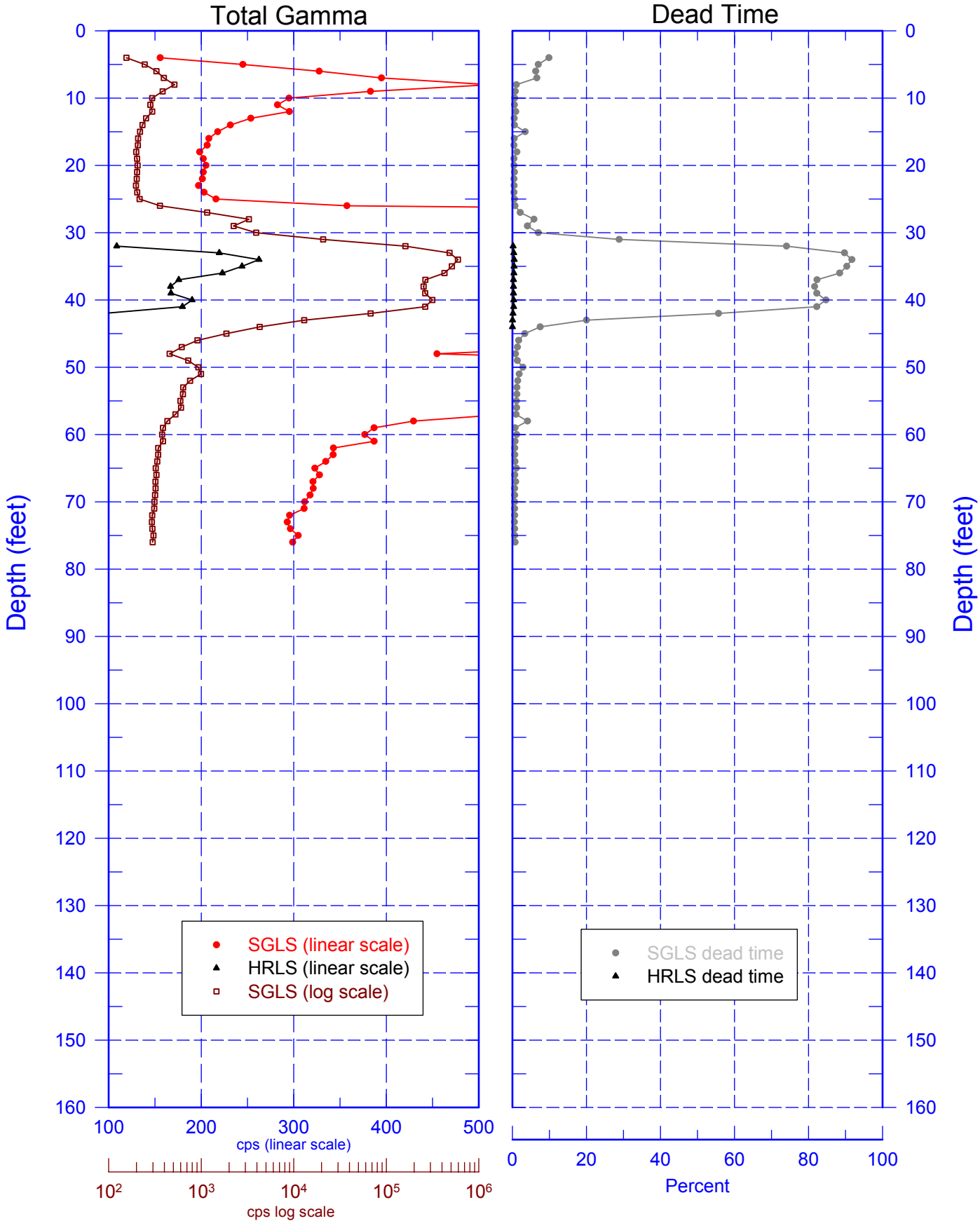


Zero Reference - Top of Casing

Depth scale: 1" = 20 ft

Last Logging Date - 10/22/03

299-W11-58 (A7300)
Total Gamma & Dead Time

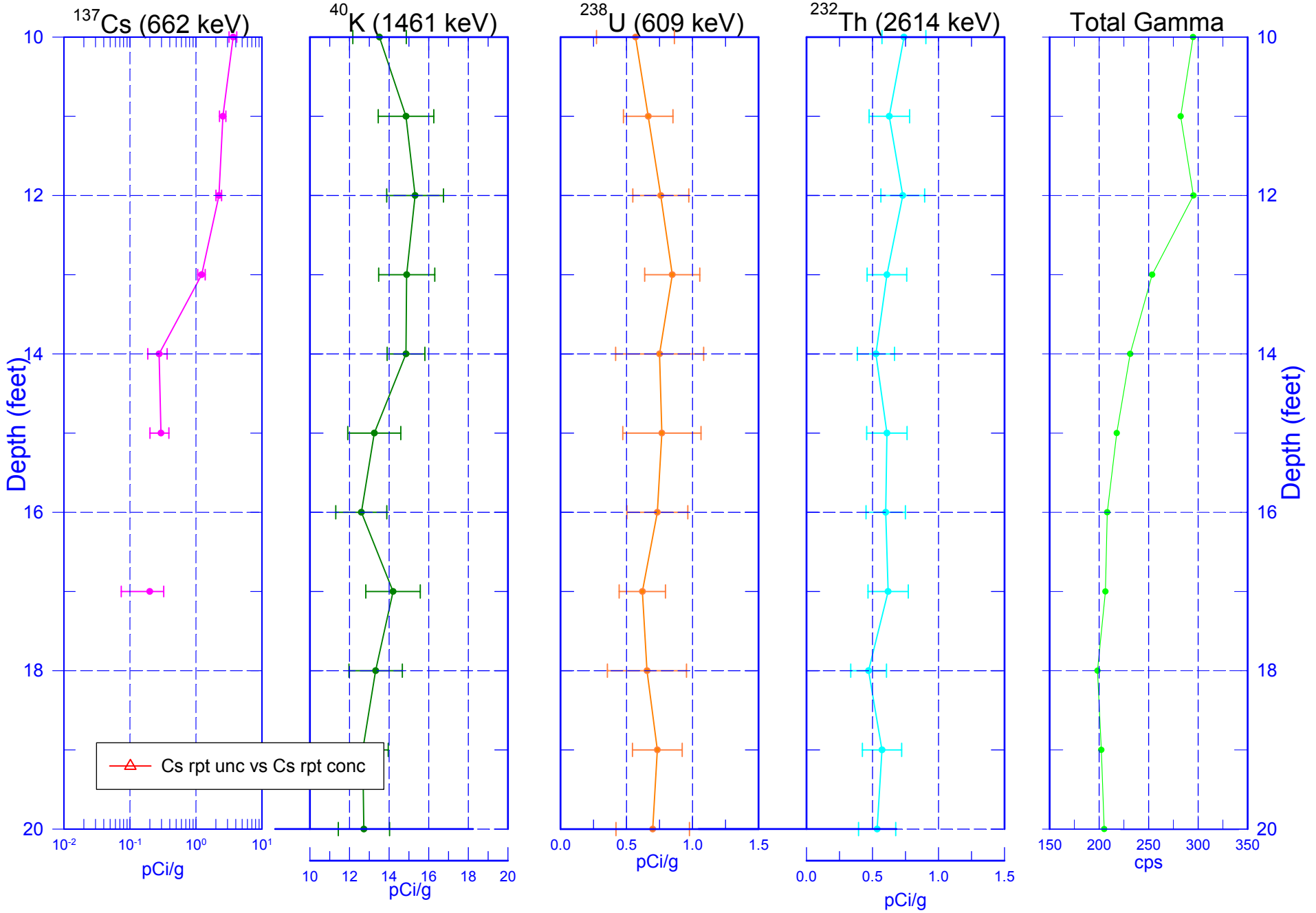


Reference - Top of Casing

Depth scale: 1" = 20 ft

Last Log Date - 10/22/03

299-W11-58 (A7300) Repeat Section



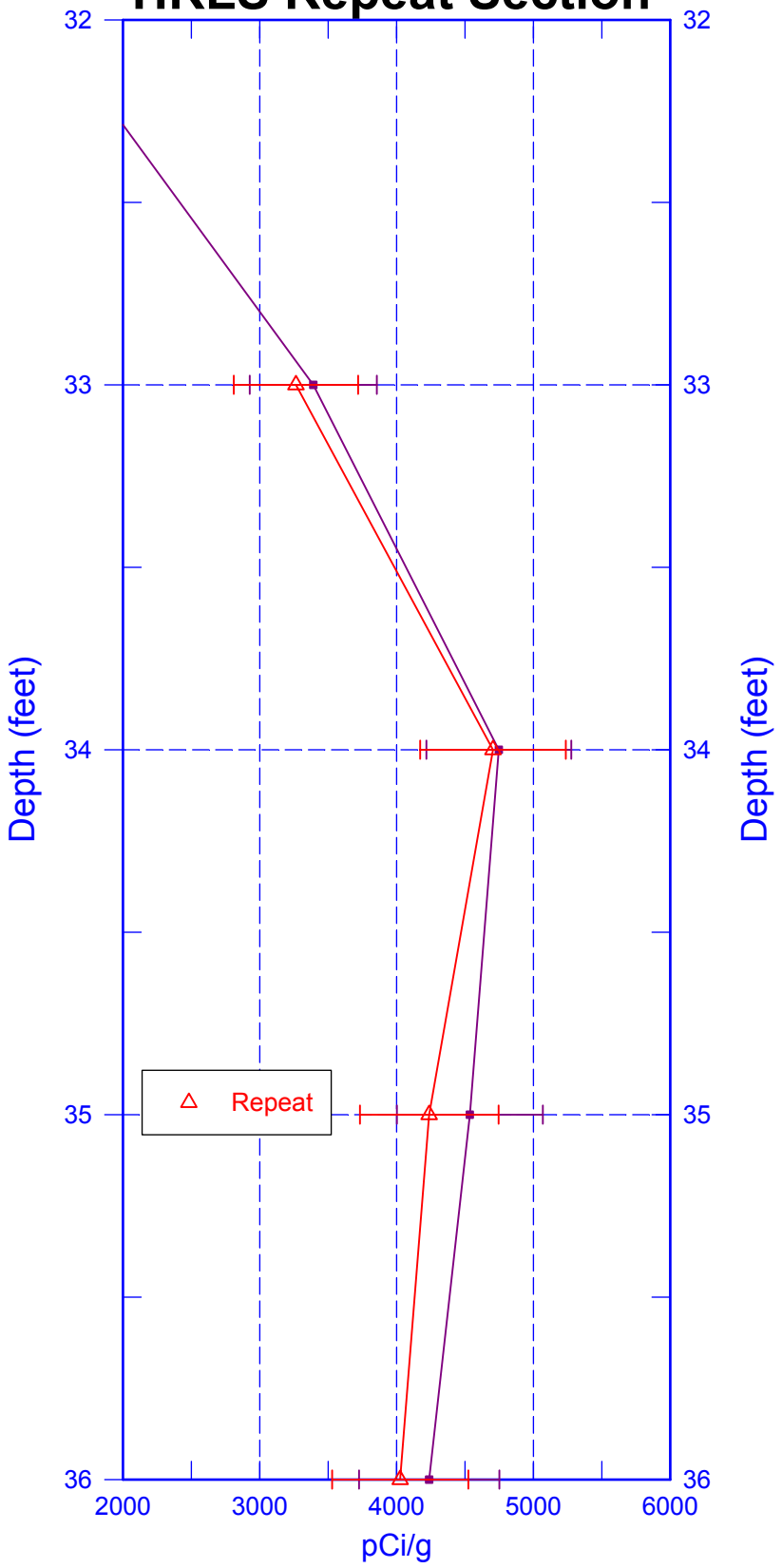
Zero Reference - Top of Casing

Depth scale: 1" = 20 ft

Last Logging Date - 10/22/03

299-W11-58 (A7300)

HRLS Repeat Section

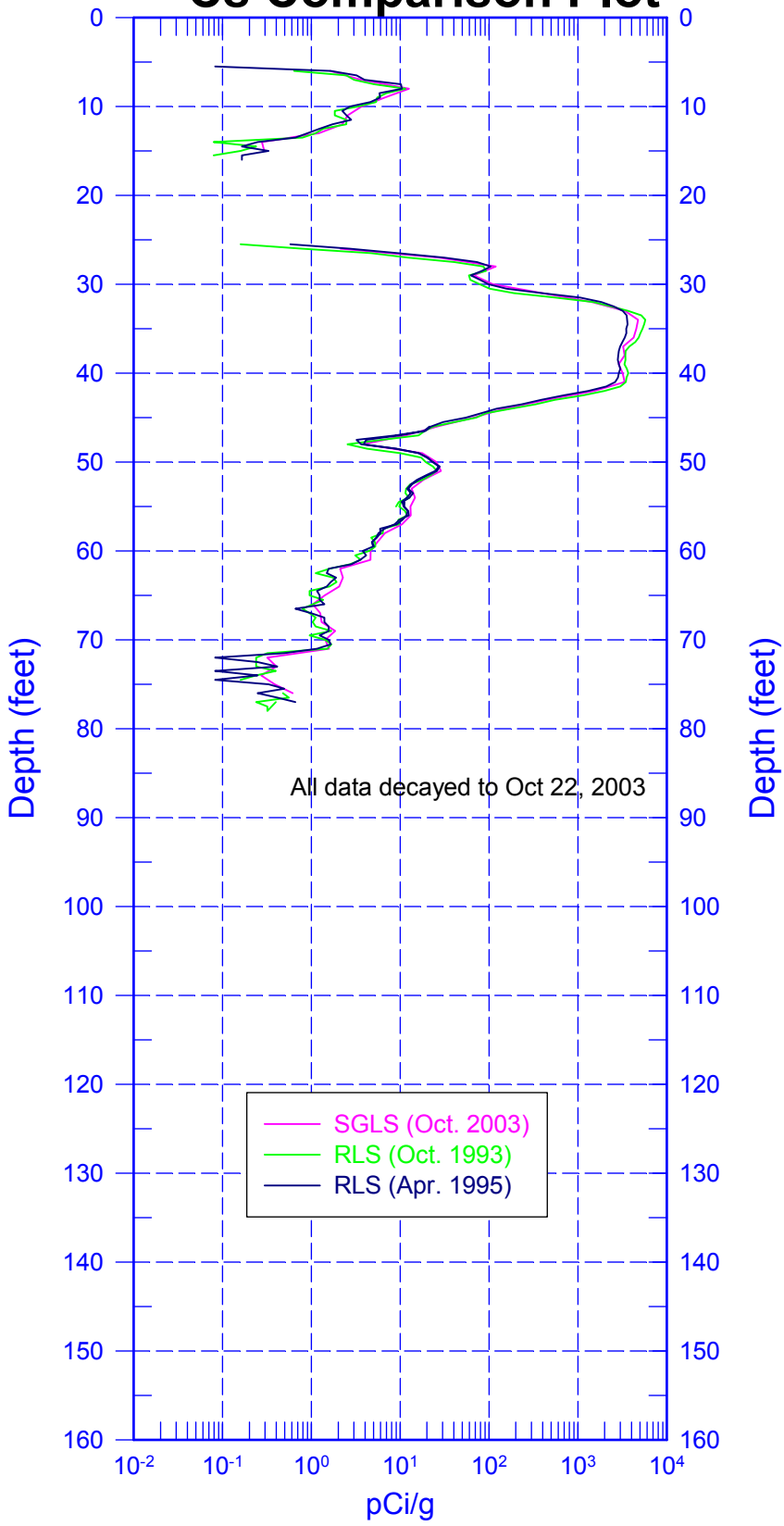


Zero Reference - Top of Casing

Last Log Date - 10/22/03

299-W11-58 (A7300)

^{137}Cs Comparison Plot



Zero Reference - Top of Casing

Depth scale: 1" = 20 ft

Last Log Date - 10/22/03